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FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE

ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Survival of Three Grass Species After Inundation¹

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Abstract

Three grass species characteristically found in Southwestern areas that are periodically flooded were studied to determine how long they could remain under water and still survive. Desert saltgrass, alkali sacaton, and western wheatgrass were either totally or partially submerged for periods of 0, 3, 6, 12, and 24 days. All three species studies can survive at least 24 days of complete or partial inundation.

Keywords: *Distichlis stricta*, *Sporobolus airoides*, *Agropyron smithii*, revegetation.

Land managers often overlook plant placement in relation to topography in revegetation efforts. Germination of seeded stands or survival of transplants indicates success of plantings. Plants in low places that are likely to be inundated on occasion are seldom missed if they don't survive.

¹The research reported here is a contribution to the SEAM program. SEAM, an acronym for Surface Environment and Mining, is a Forest Service program to research, develop, and apply technology that will help maintain a quality environment and other surface values while helping meet the Nation's mineral requirements.

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Yet these places can be revegetated also if tolerant plants are used. This Note discusses some plants that can be grown successfully in these places.

The three grass species studied here are characteristically found in Southwestern areas subject to periodic flooding. The question we addressed was how long could they remain under water and still survive. A previous study of fourwing saltbush (*Atriplex canescens*) indicated 4-week-old shrub transplants were subject to high mortality if planted in areas likely to be inundated longer than a 30 hr period³.

³Aldon, Earl F. 1970. Fourwing saltbush survival after inundation. USDA For. Serv. Res. Note RM-165, 2 p. Rocky Mt. For. and Range Exp. Stn., Fort Collins, Colo.

Methods

Three grass species were tested for 0, 3, 6, 12, and 24 days partially and totally under water. Three replications (one plant each) of desert saltgrass (*Distichlis stricta*), alkali sacaton (*Sporobolus airoides*), and western wheatgrass (*Agropyron smithii*) were placed in large metal containers and either totally submerged in tap water or the crowns, but not the leaves, were covered with water. Water levels were held constant during the study. Prior to the study the plants had been grown for 6 months in alluvial soil in individual pots.

After the period of inundation, the plants were removed from the water and maintained in the greenhouse for 30 days to determine mortality. Vigor was evaluated visually on a scale of 1 = poor to 4 = very good the day after the submergence period ended and again 1 month later.

Results

All plants survived all treatments (table 1) and began growing vigorously after their removal

from the water. There was no vigor difference between plants partially submerged and those totally submerged, so these data were combined in the statistical analysis. Desert saltgrass showed a significant loss in vigor the longer it was submerged and a significant recovery when measured 30 days later. After removal from water, saltgrass began sending up new plants, presumably from rhizomes. Western wheatgrass showed similar losses in vigor with increased submergence but a less clearcut recovery when measured 30 days later. Alkali sacaton showed an apparent loss in vigor after 24 days submergence and improvement 30 days later, but these were nonsignificant.

In general, the longer plants were submerged, the poorer their vigor when measured immediately after removal. When measured again a month later, overall vigor ratings of submerged plants had improved.

All three of these floodplain species can survive at least 24 days of complete or partial inundation.

Table 1.—Average vigor¹ of three grass species 1 day and 30 days after various inundation treatments.

Inundation treatment (Days)	Alkali sacaton		Desert saltgrass		Western wheatgrass	
	1 day	30 days	1 day	30 days	1 day	30 days
None	2.83	2.50	1.83ab ²	1.67	3.00a	3.00
3	2.67	2.17	2.00a	3.50	2.67ab	2.50
6	2.50	2.50	1.83ab	2.83	3.50a	2.50
12	2.33	2.50	1.50ab	2.50	2.25ab	3.00
24	1.50	2.33	1.00b	2.17	1.75b	2.50

¹Vigor ratings: 1 = poor; 2 = fair; 3 = good; 4 = very good.

²Column means having no letters are not different. Column means with the same letters are not significantly different at the 5% level.

